ABSTRACT

The steel drill string attached to a drilling bit during typical rotary drilling operations used to drill oil and gas wells is used for a second purpose as the casing that is cemented in place during typical oil and gas well completions. Methods of operation are described that provide for the efficient installation a cemented steel cased well wherein the drill string and the drill bit are cemented into place during one single drilling pass down into the earth. The normal mud passages or watercourses present in the rotary drill bit are used for the second independent purpose of passing cement into the annulus between the casing and the well while cementing the drill string into place during one single pass into the earth. A one-way cement valve is installed near the drill bit of the drill string that allows the cement to set up efficiently under ambiently hydrostatic conditions while the drill string and drill bit are cemented into place during one single drilling pass into the earth.